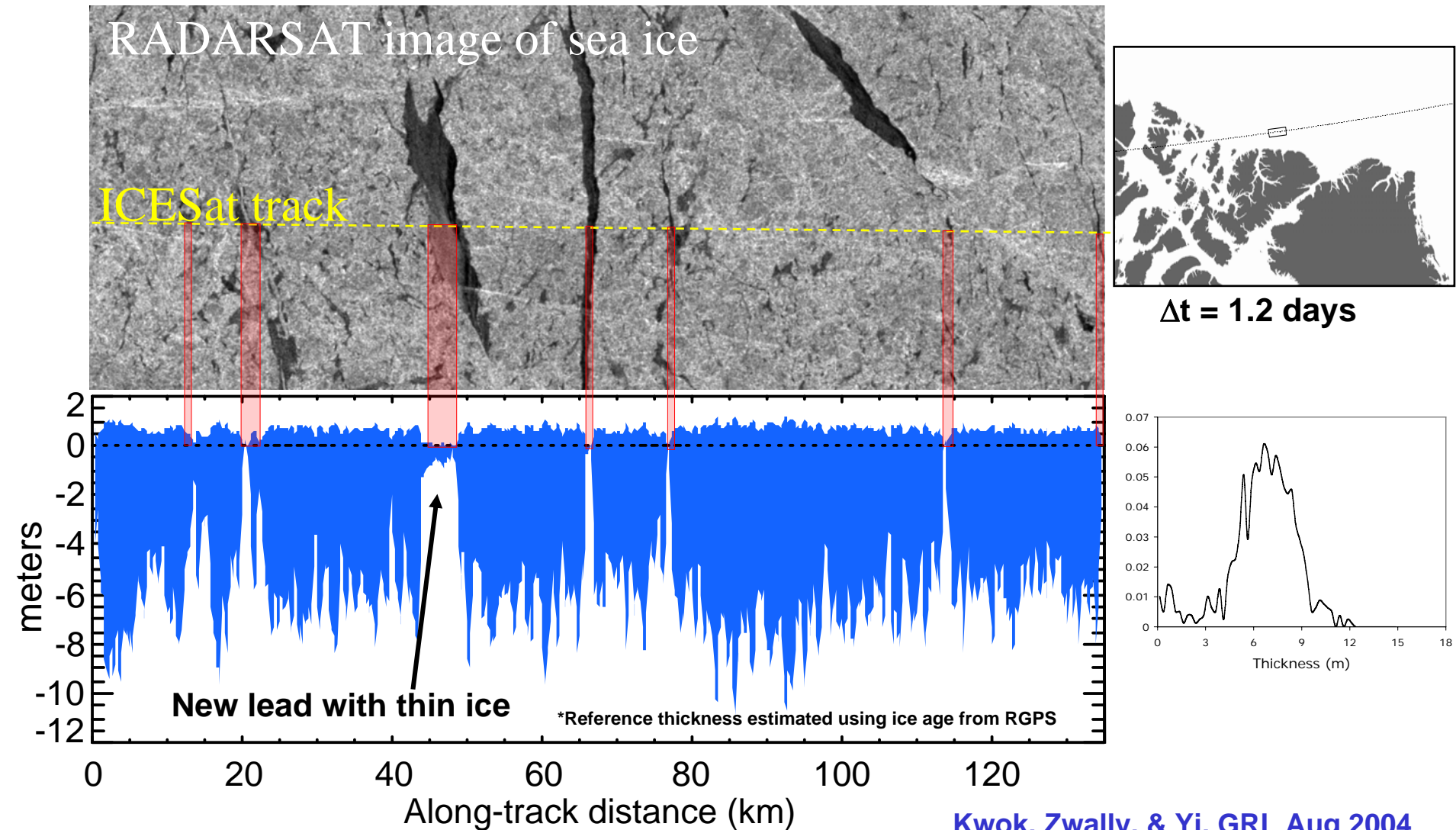

Mapping Sea-Ice Freeboard-Height Distributions and Ice Thicknesses with ICESat

H. Jay Zwally, Donghui Yi, and Jack Saba

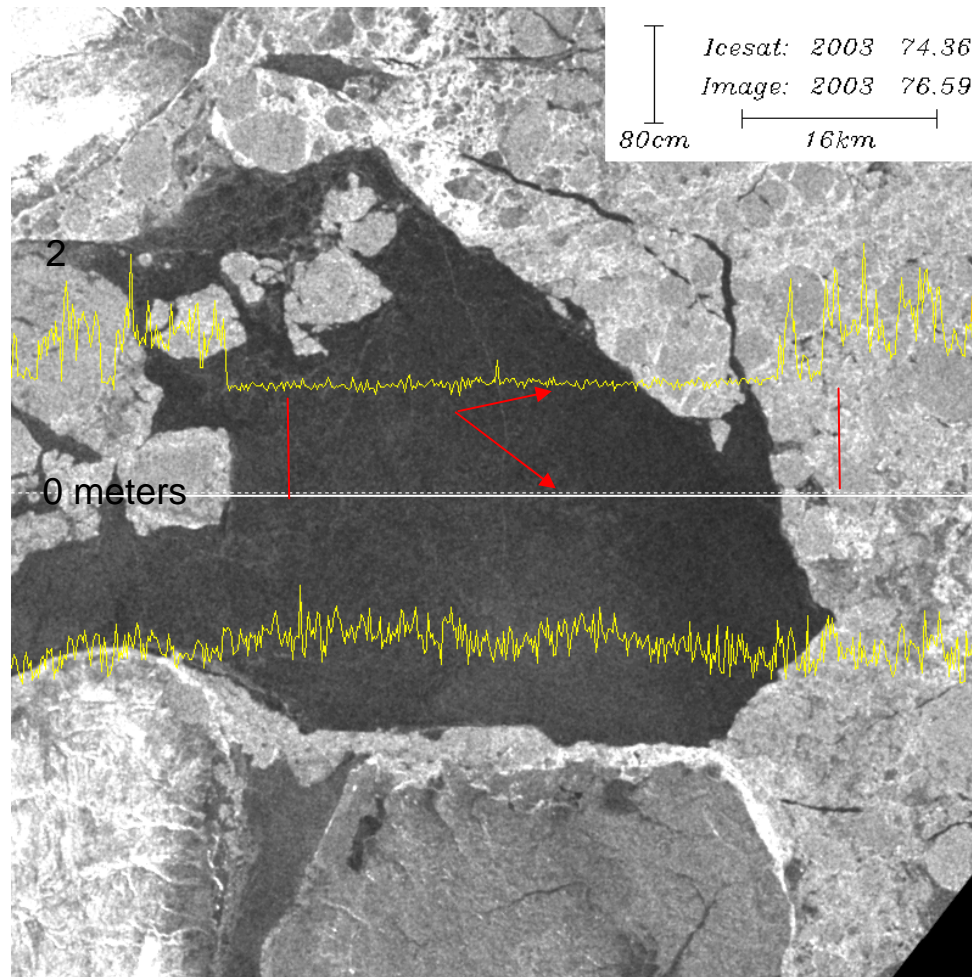
AASI Workshop Jan. 13, 14 2005



Near-coincident ICESat and RADARSAT Data Over Arctic Sea Ice



What is the approx noise floor of retrieved elevation?



ICESat elevations

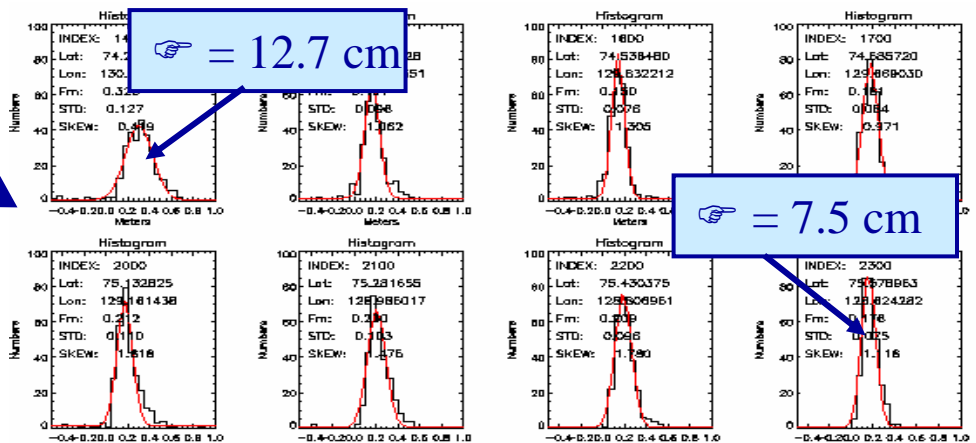
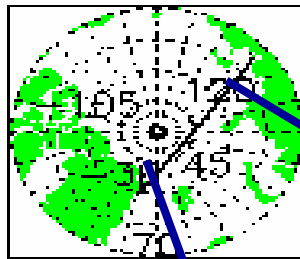
At 10 km -
~1.5 - 2 cm



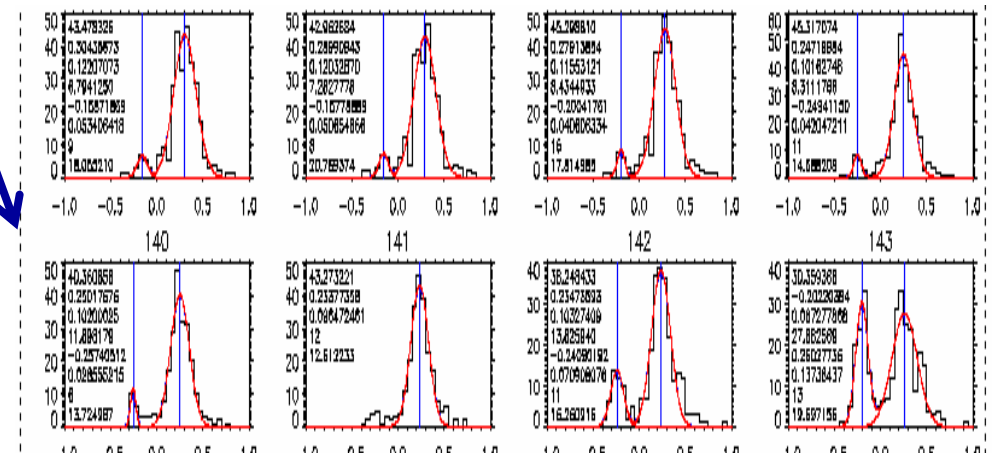
Ron Kwok, JPL

First Sea Ice Thickness Maps From Satellite Laser

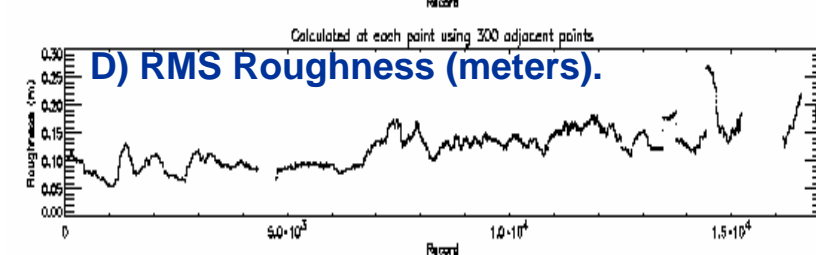
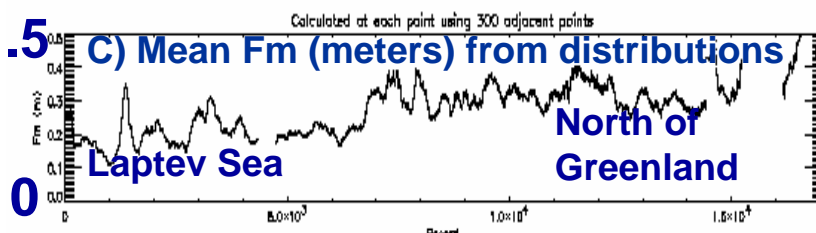
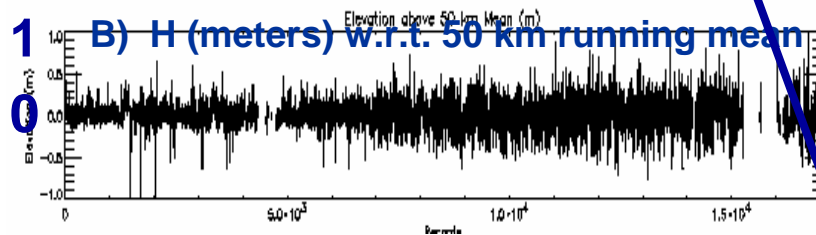
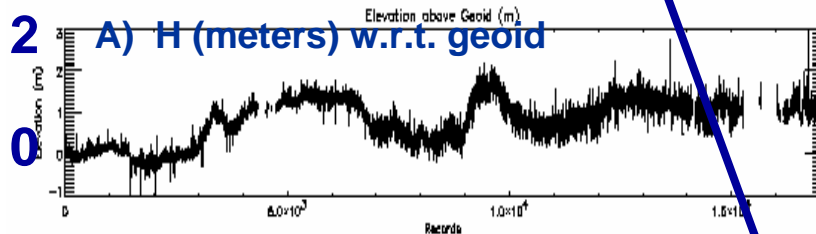
ICESat Ground Track



• F distributions of thin ice in Laptev Sea are mostly single-peaked with sharper rise and slower dropoff at higher values characteristic of ice-thickness distributions.

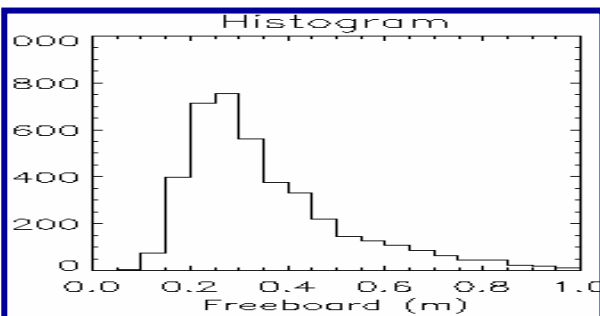
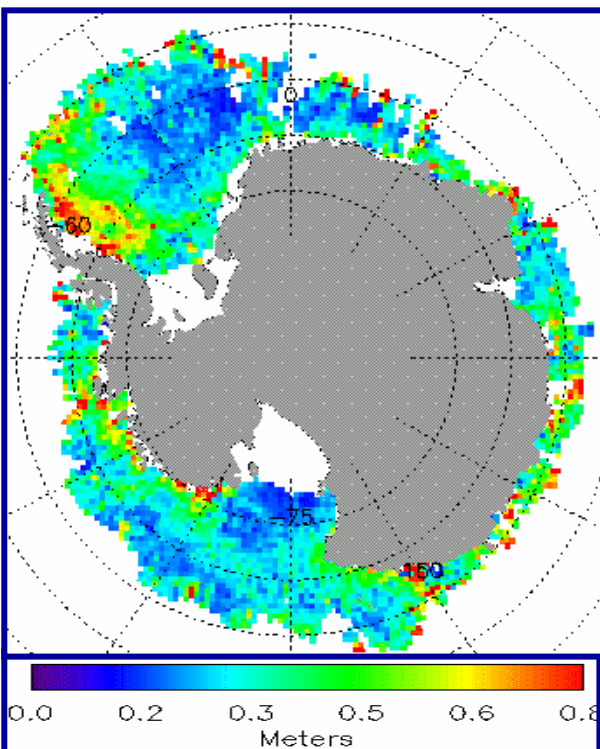


• F distributions of thicker ice North of Greenland are mostly double-peaked characteristic of mixture of first and multiyear ice.

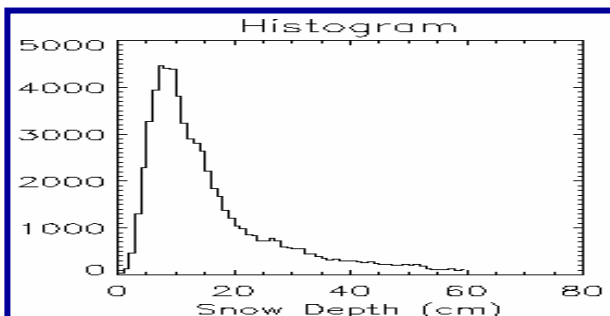
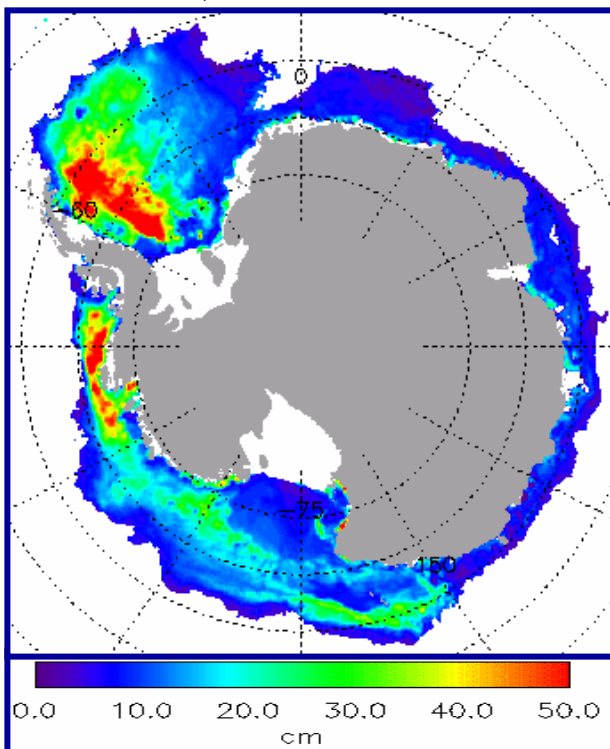


First Mapping of Antarctic Sea Ice Thickness

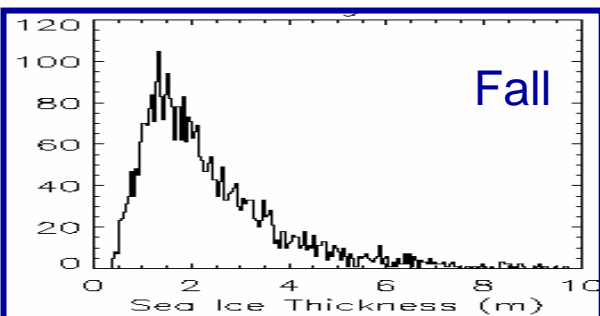
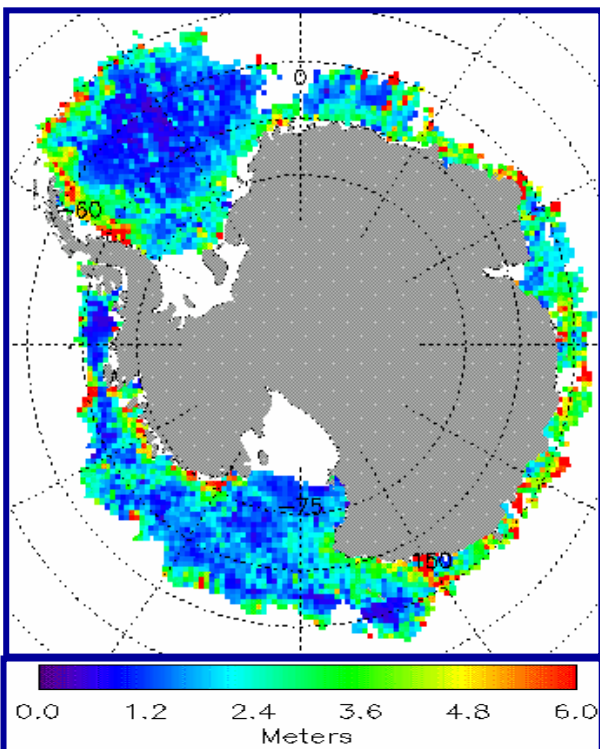
Freeboard
May 15 – Jun 24, 04



Snow cover May 24, 04
Aqua-AMSR: Markus &
Cavalieri, AGU Res. 1998

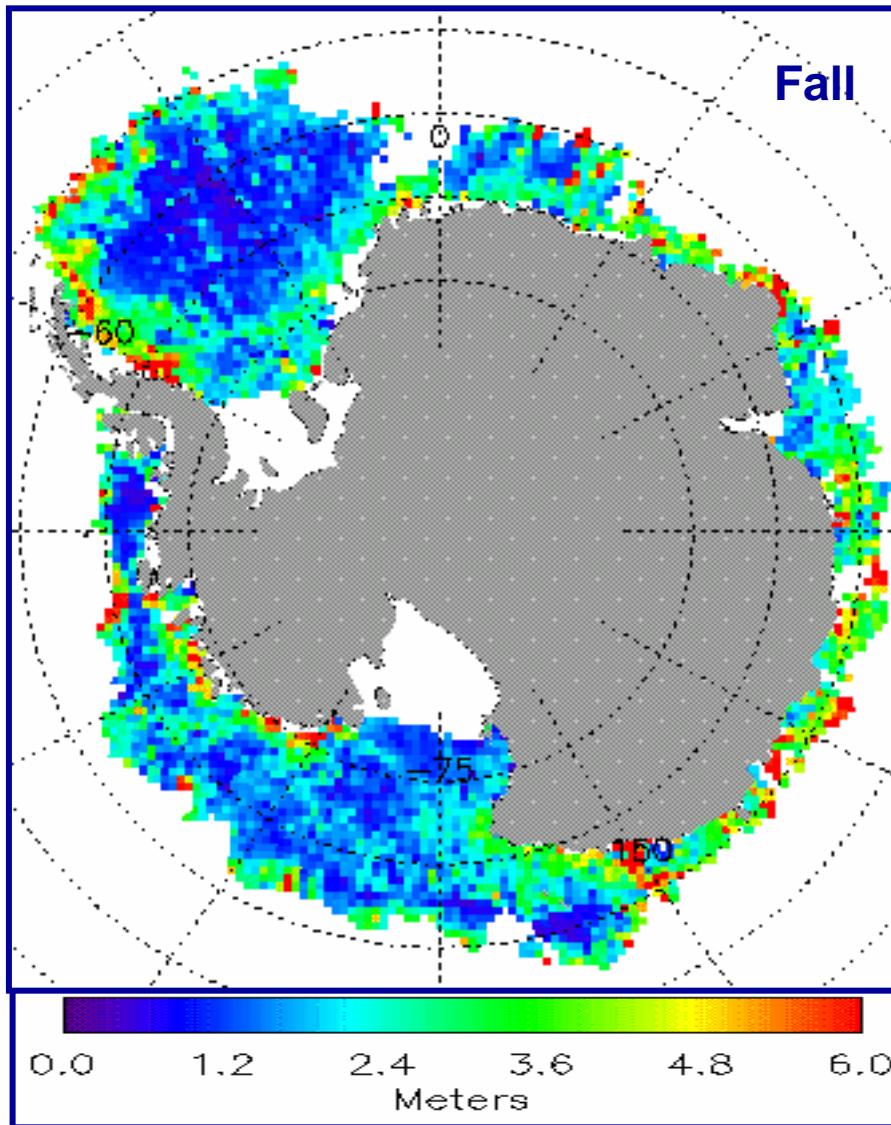


Sea Ice Thickness
May 15 – Jun 24, 04

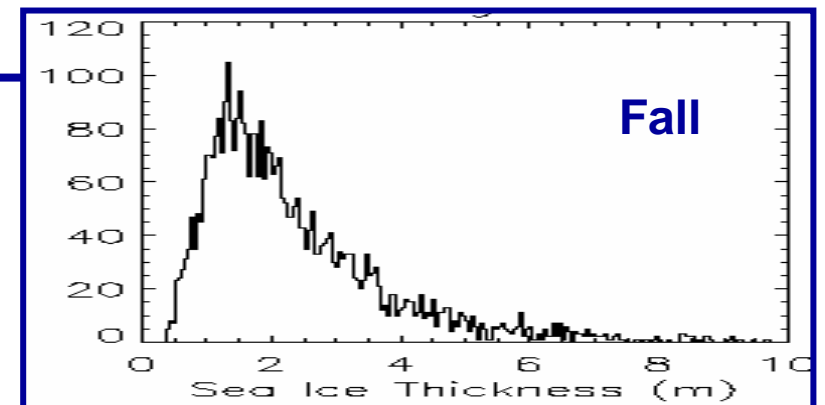
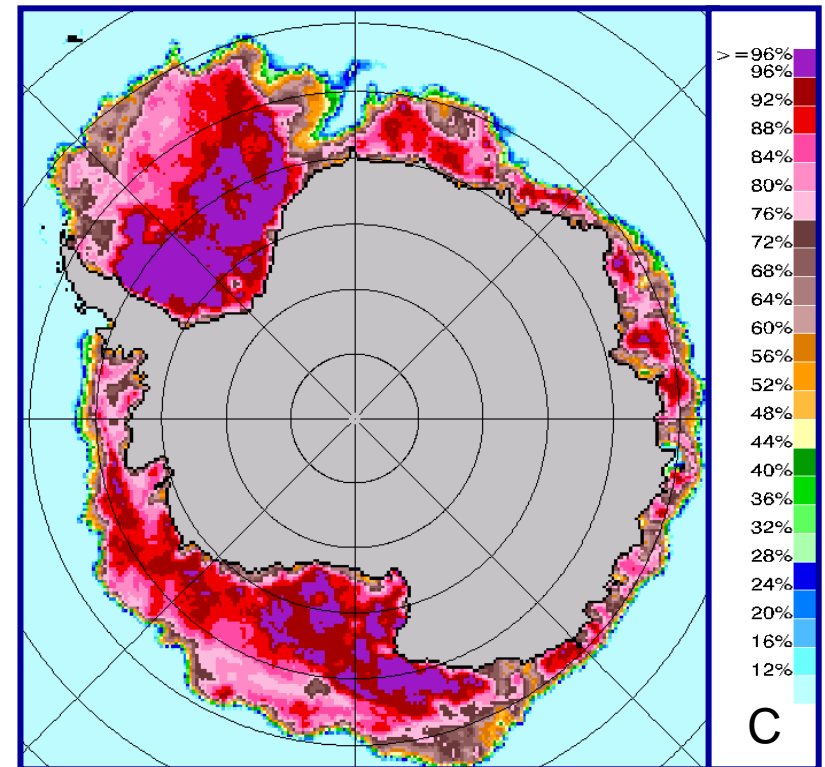


First Mapping of Antarctic Sea Ice Thickness

Sea Ice Thickness May 15 – Jun 24, 04

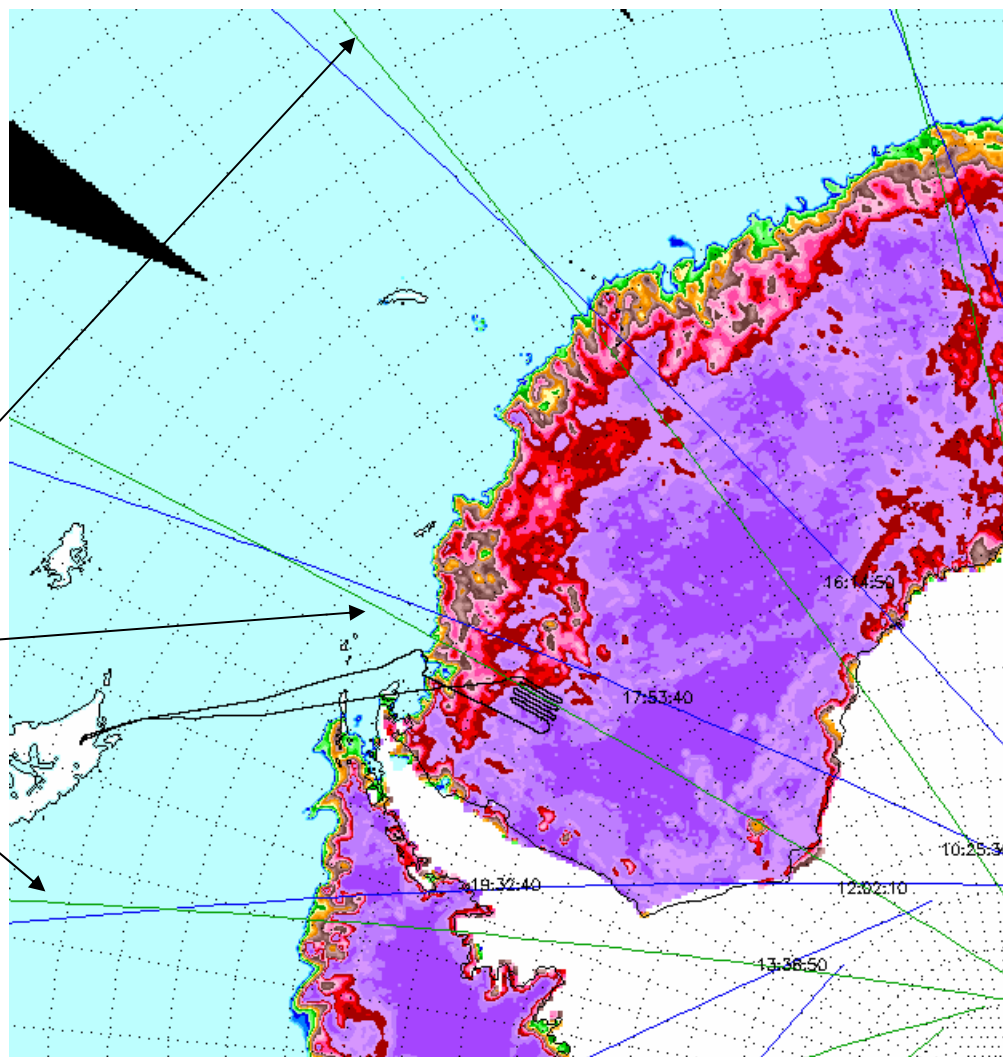


Concentration May 24, 04

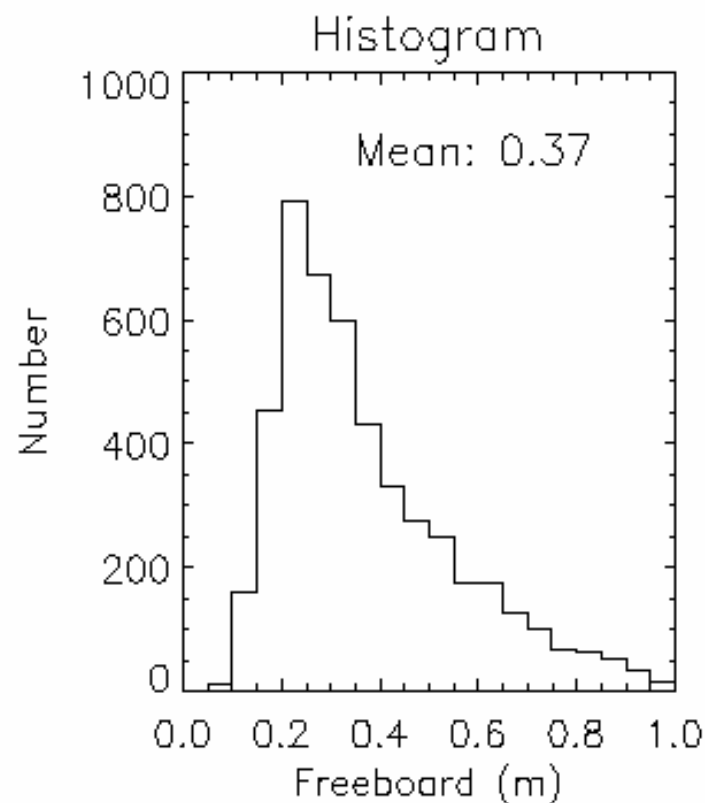
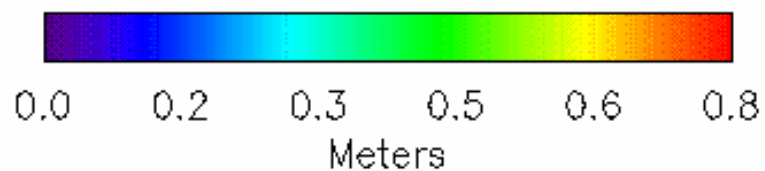
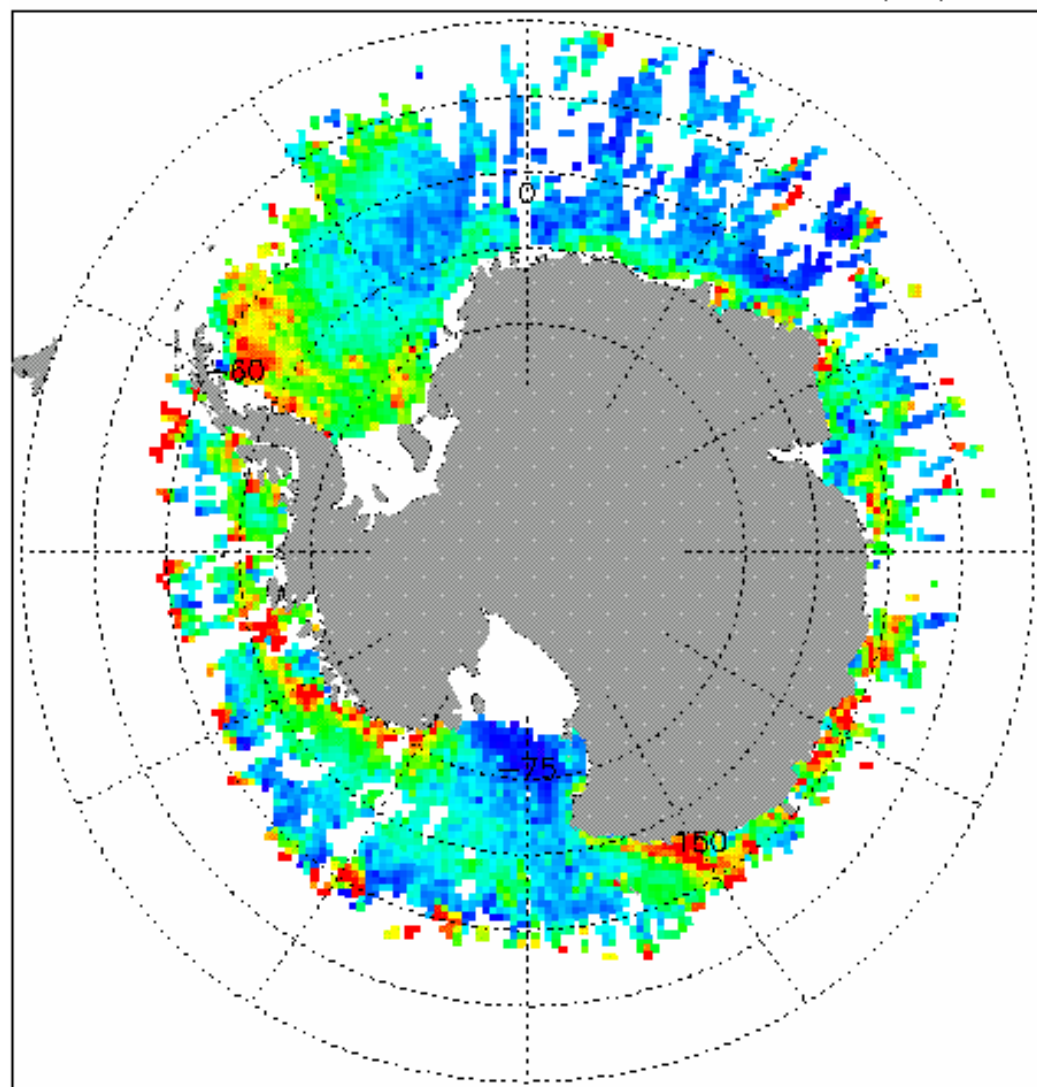


Oct 14, 2004, Field Campaign

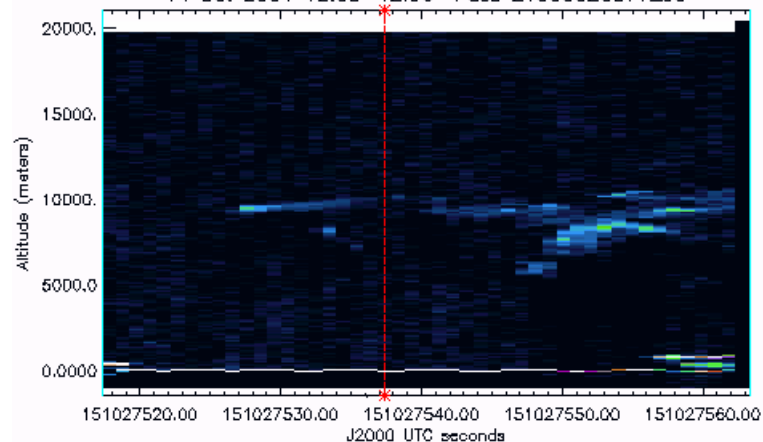
ICESat
Track



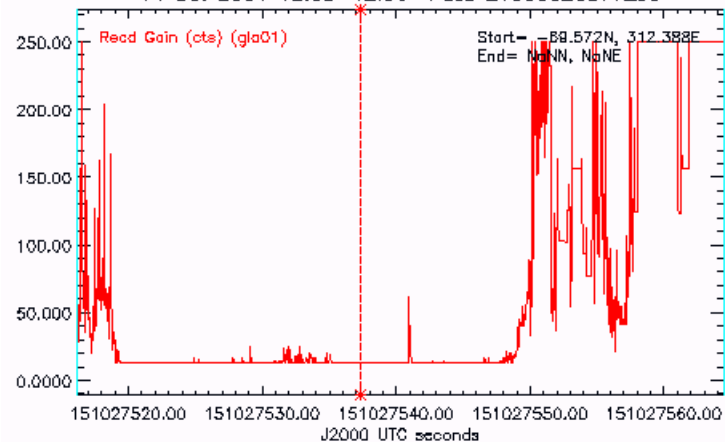
Oct 4 –Nov 8, 2004, Freeboard (m)



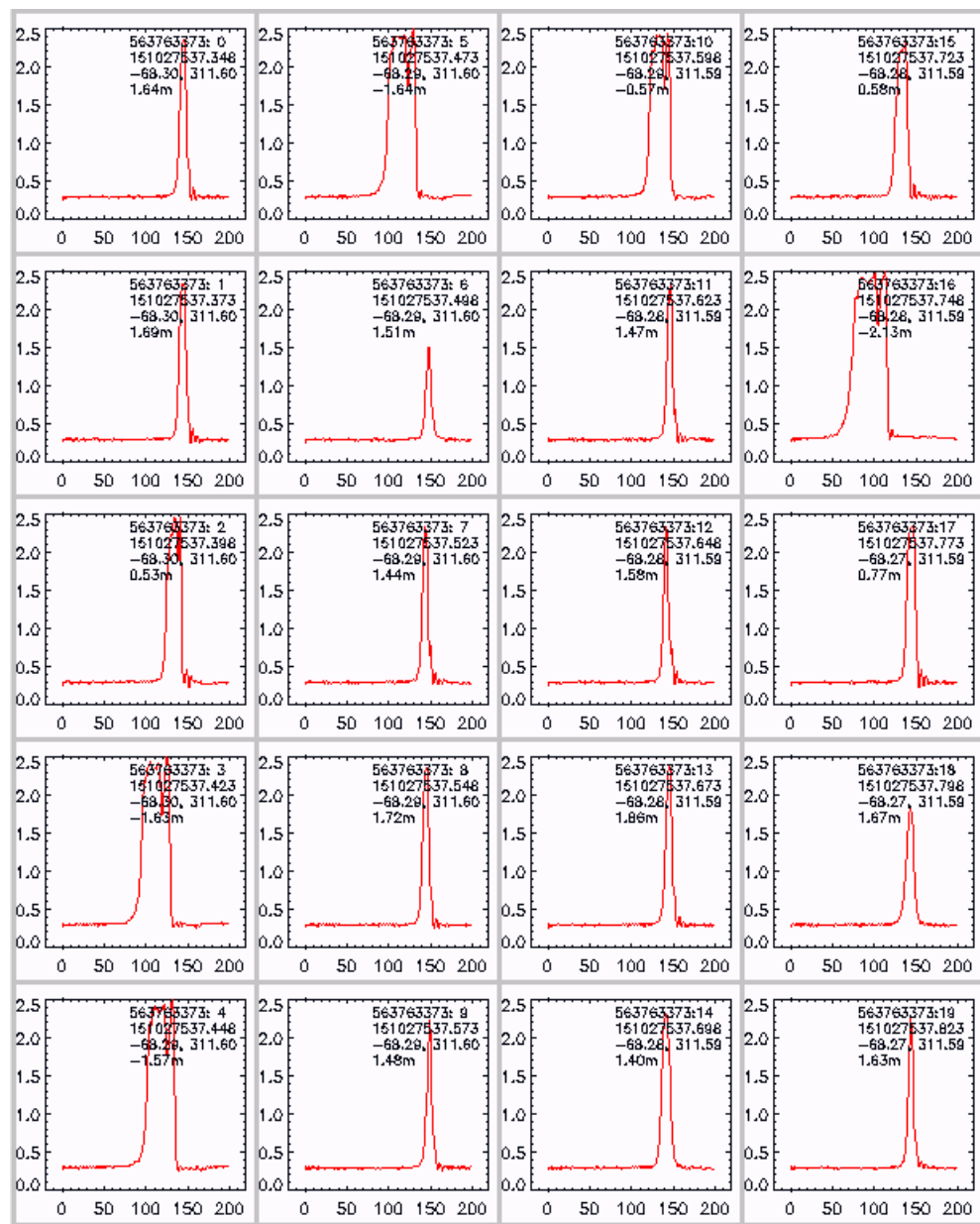
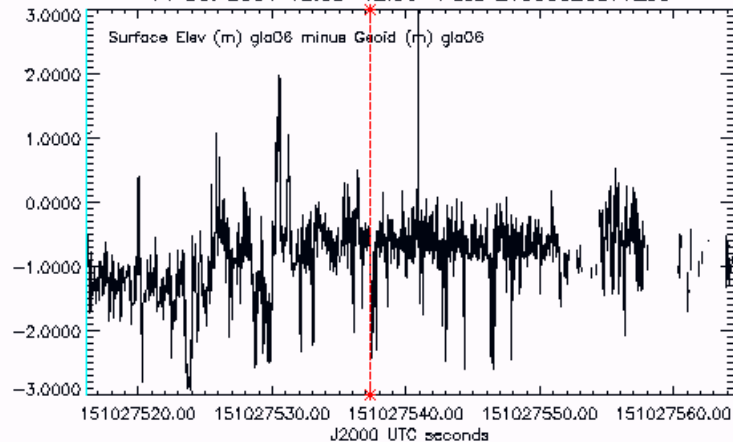
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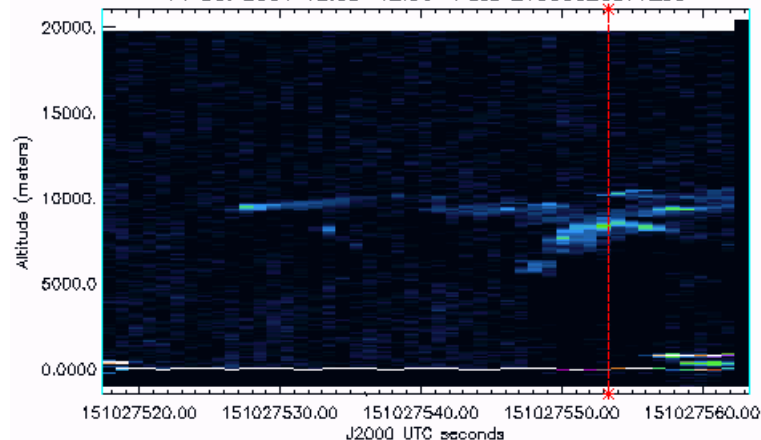
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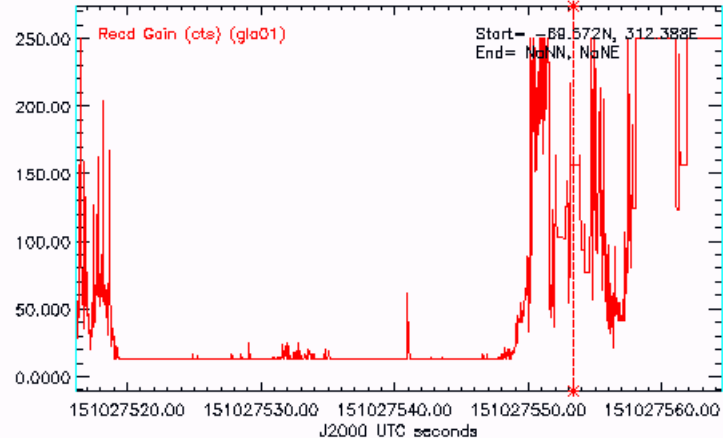
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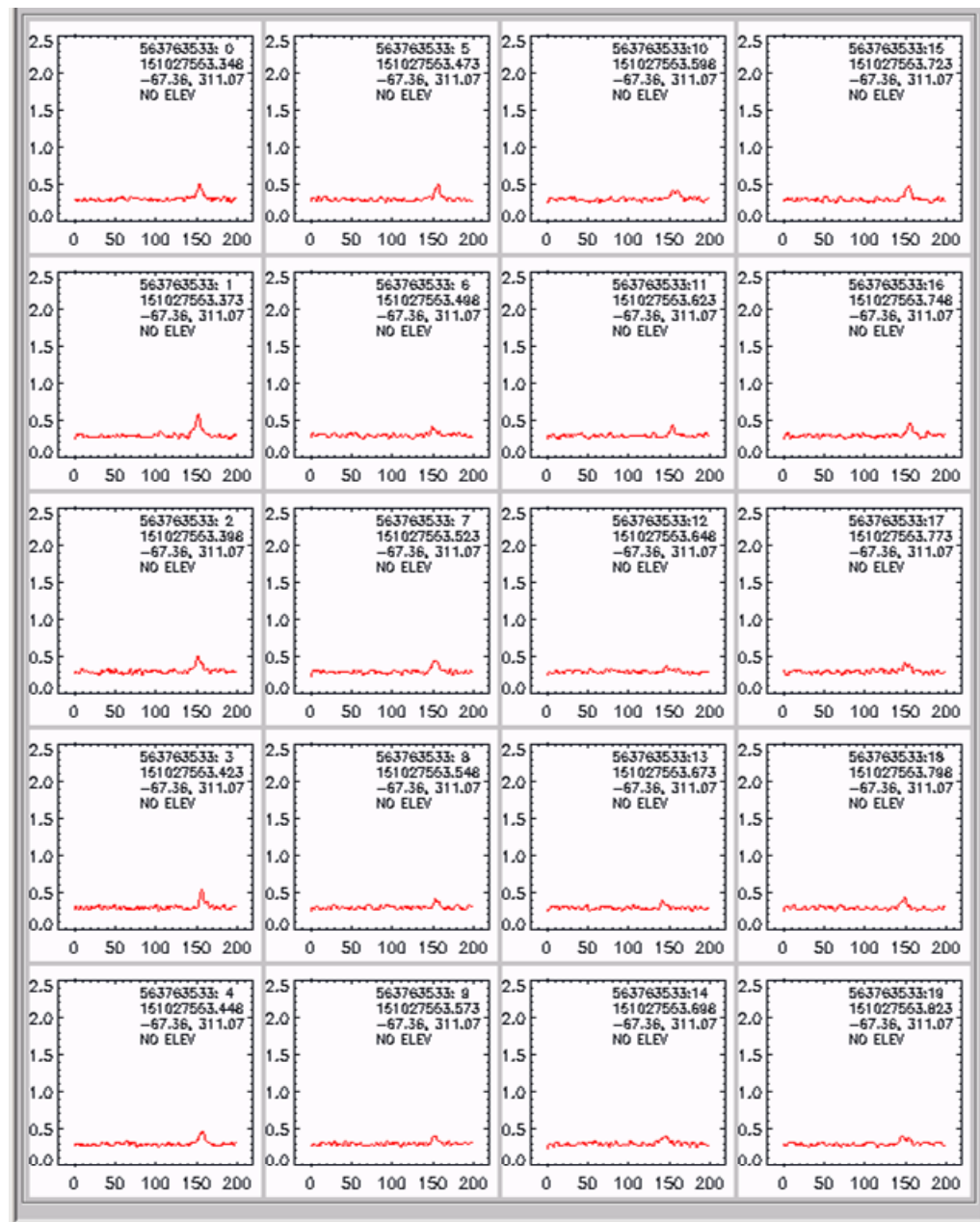
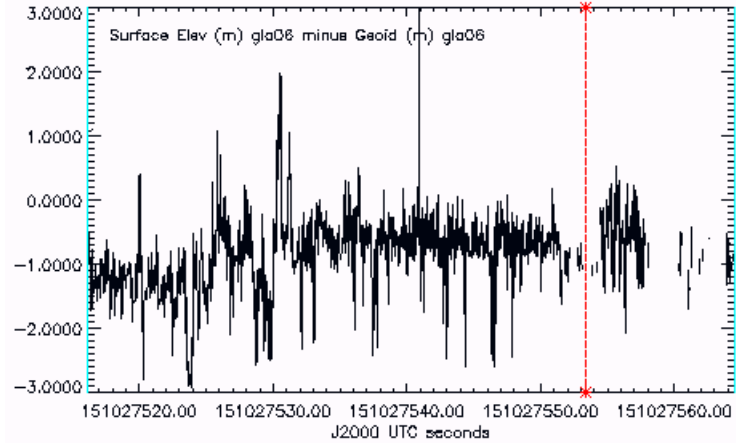
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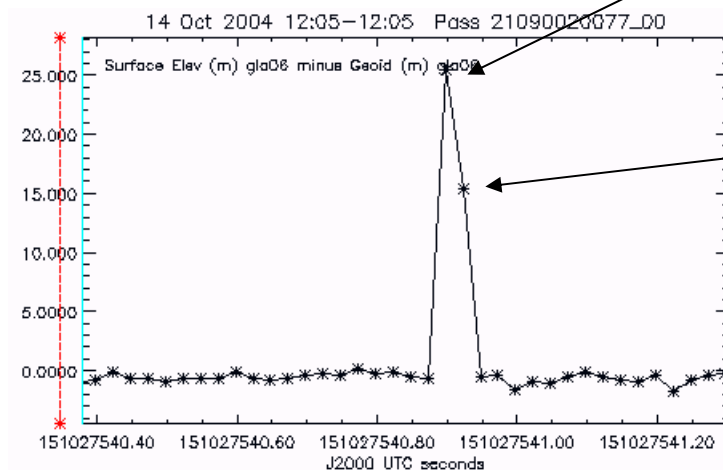
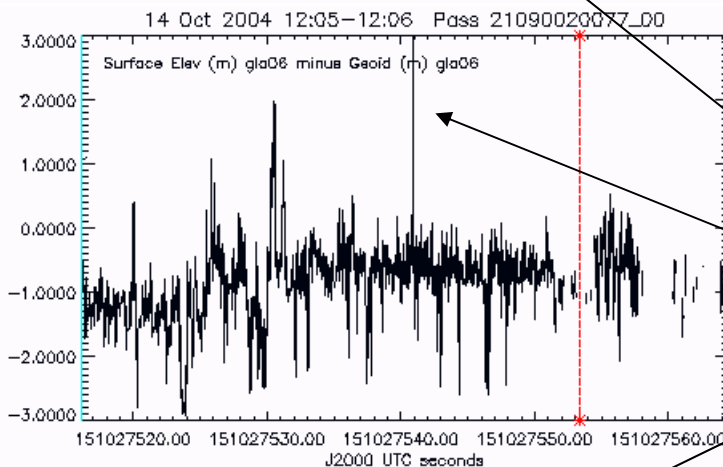
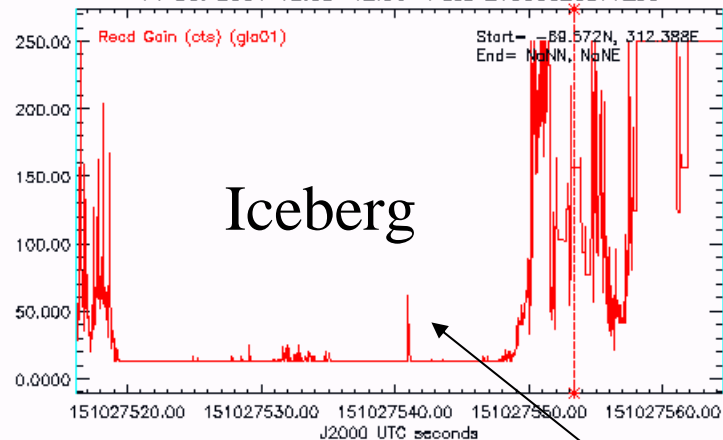
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14 Oct 2004 12:05-12:06 Pass 21090020077_D0



14 Oct 2004 12:05-12:06 Pass 21090020077_00



Thumbnails

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563763403:39:0:0

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Scroll Display

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Curves

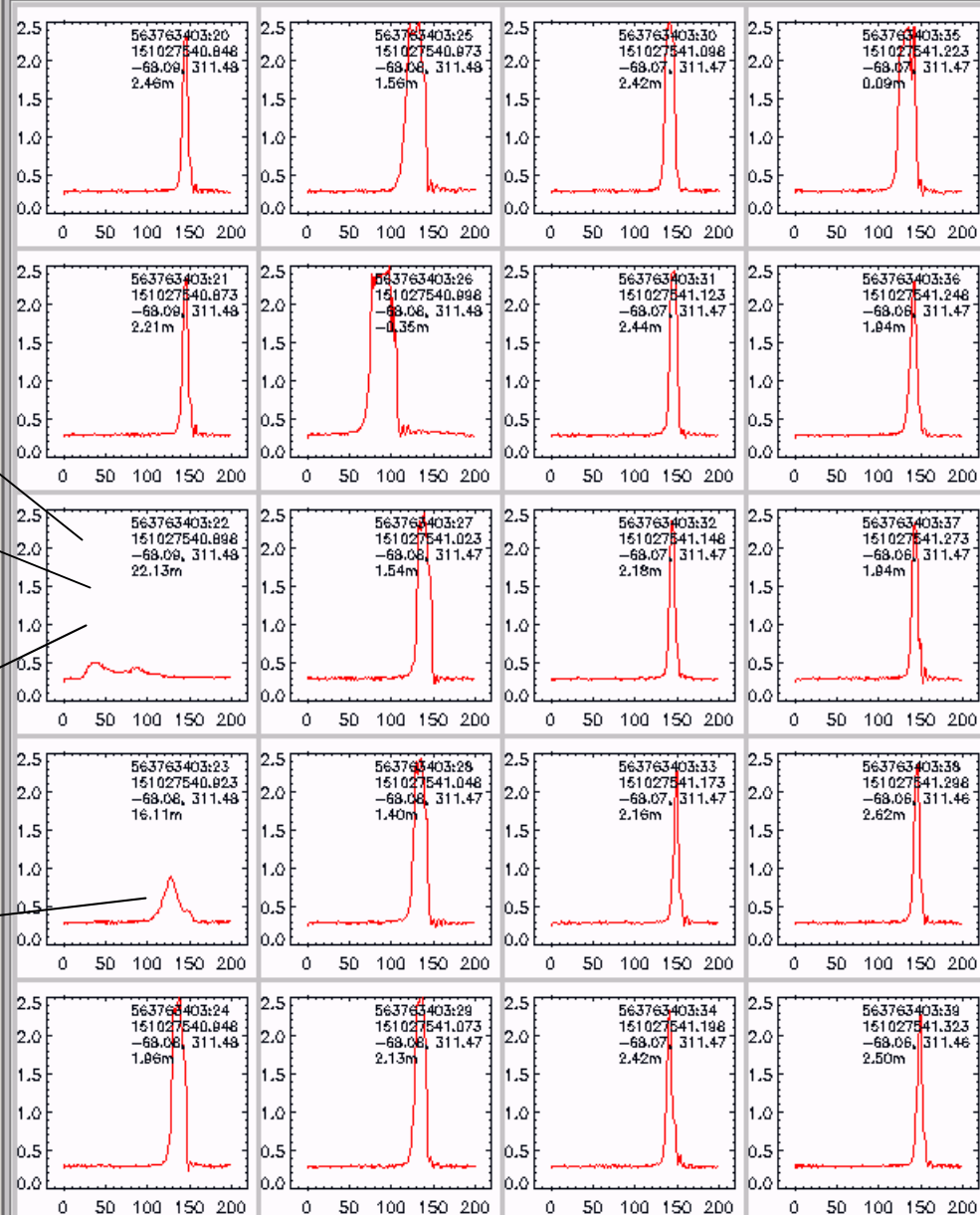
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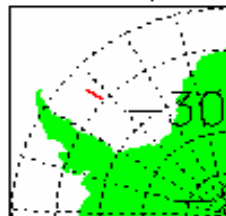
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DONE

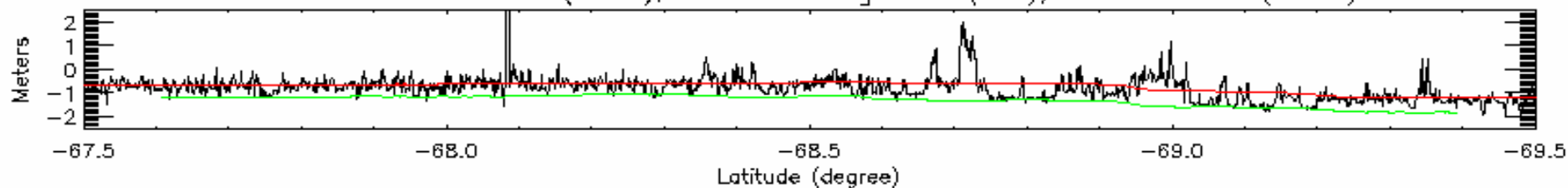
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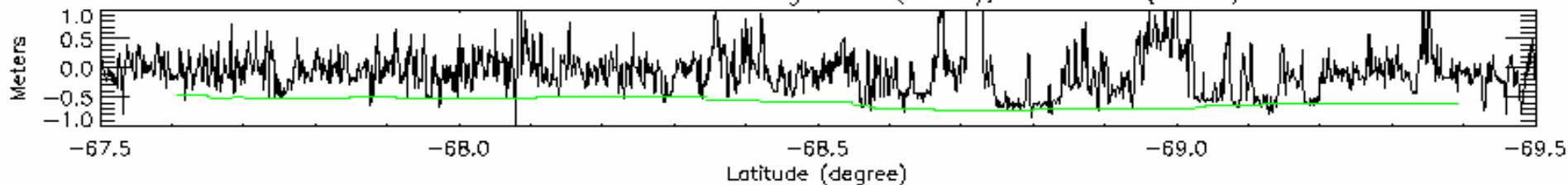
Track 77 cycle 2



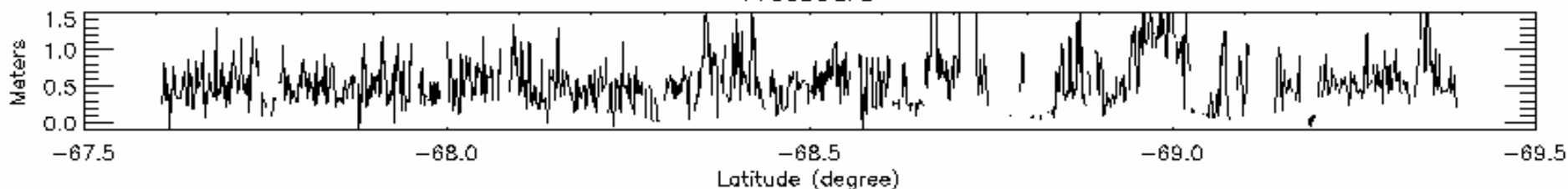
Elevation above Geoid (Black), 50 km running Mean (Red), and Sea Level (Green)



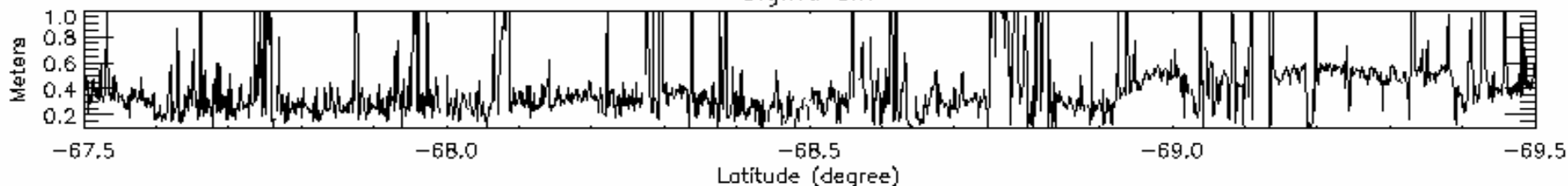
Elevation w.r.t. 50 Km Running Mean (Black), Sea Level (Green)

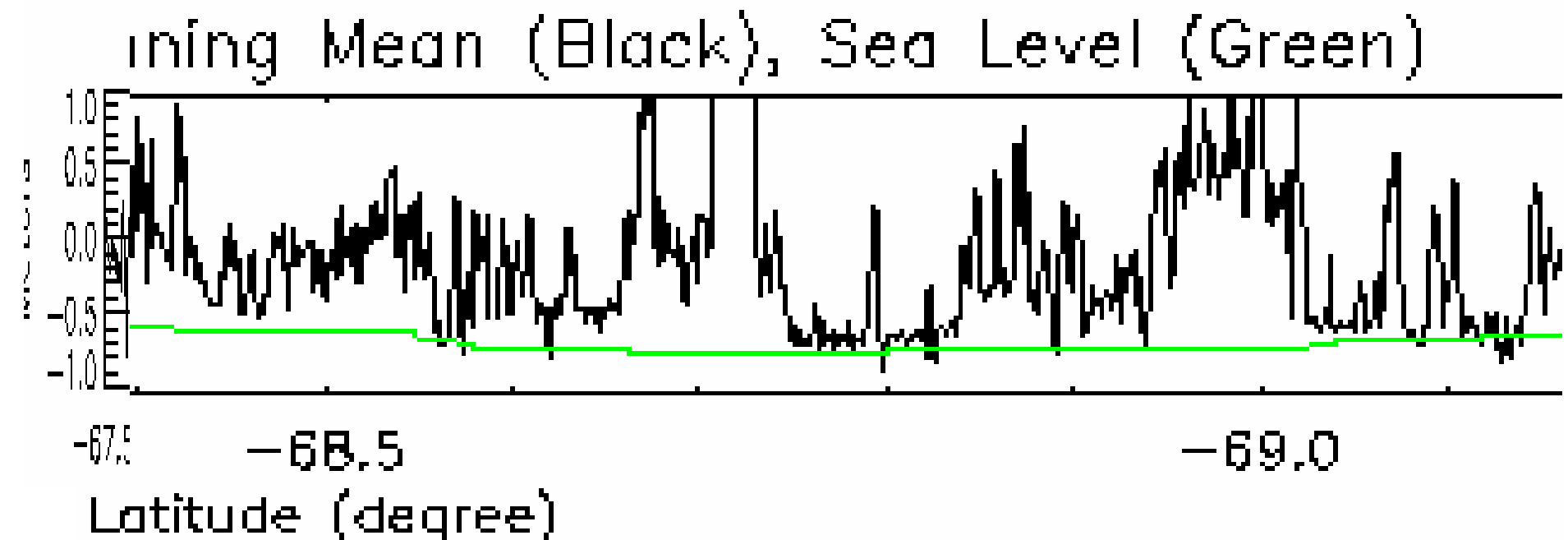
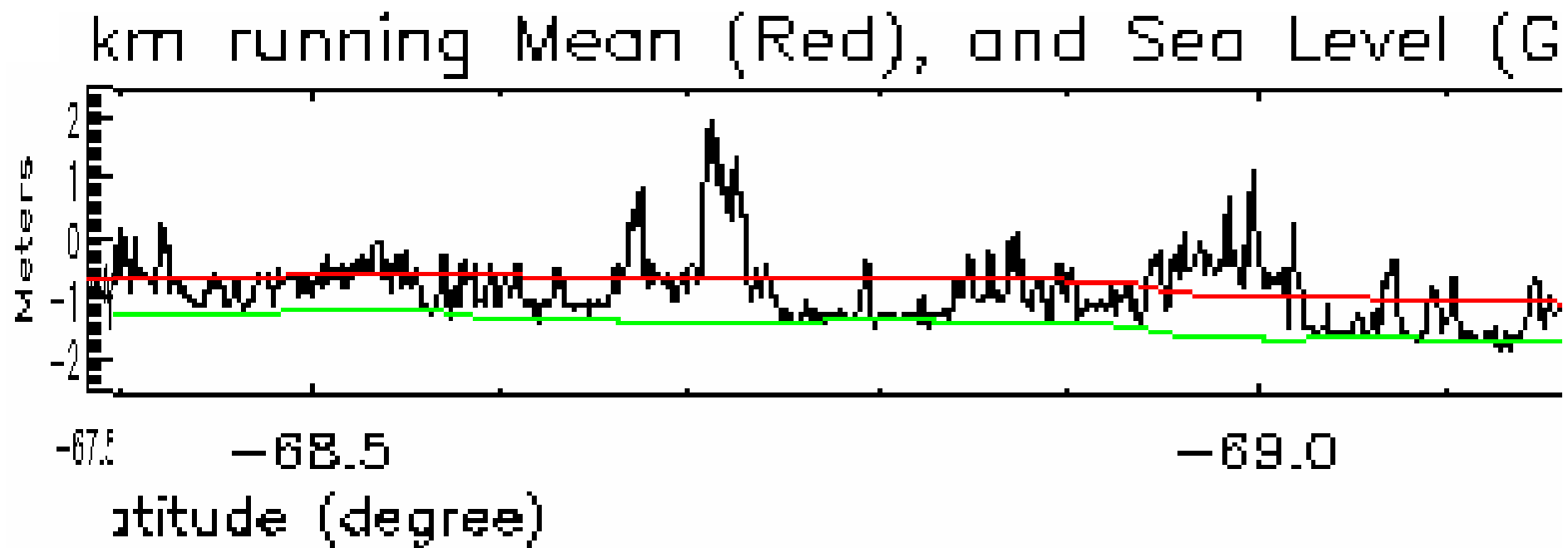


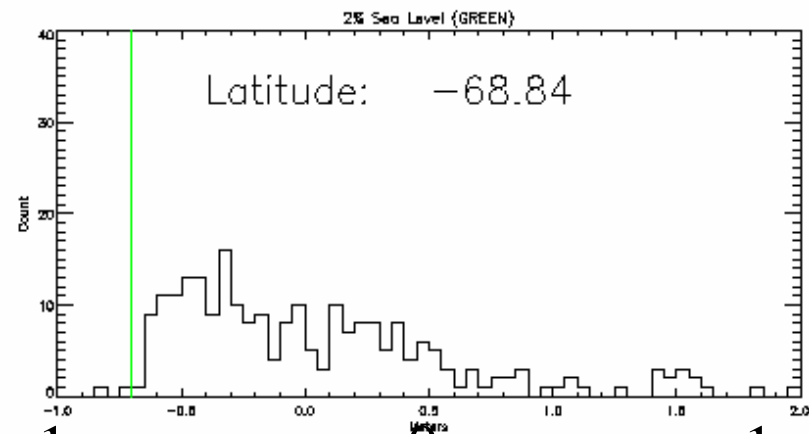
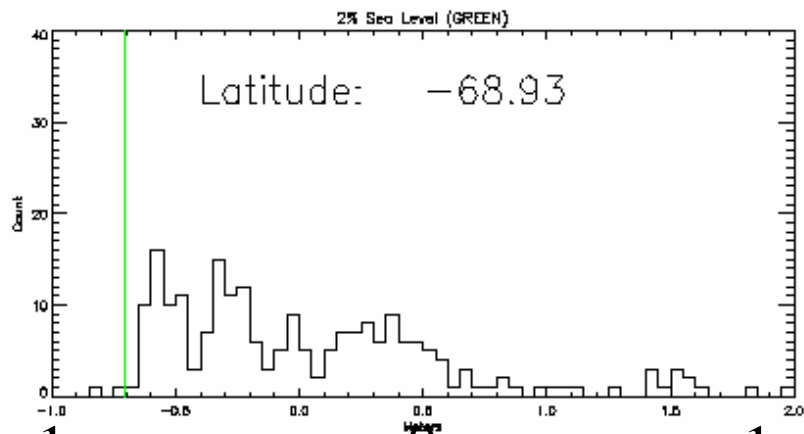
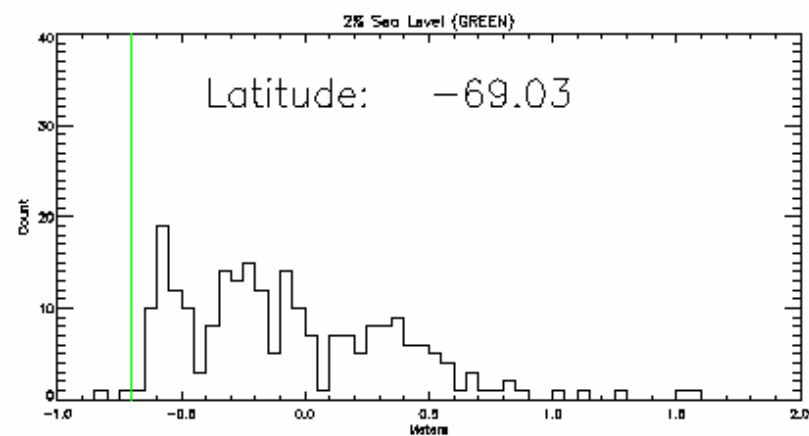
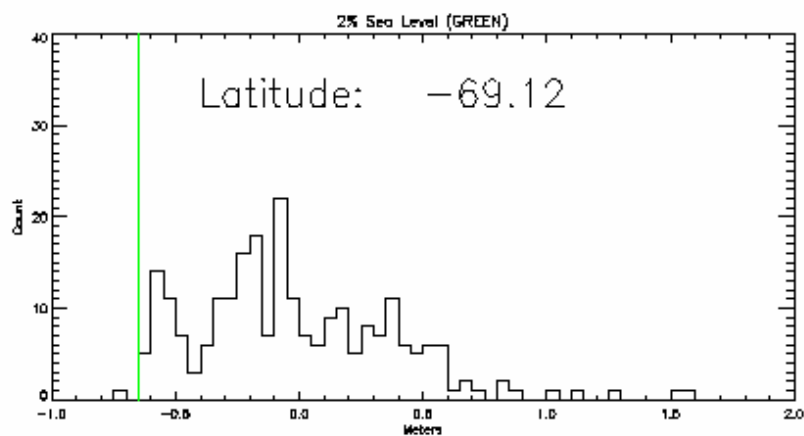
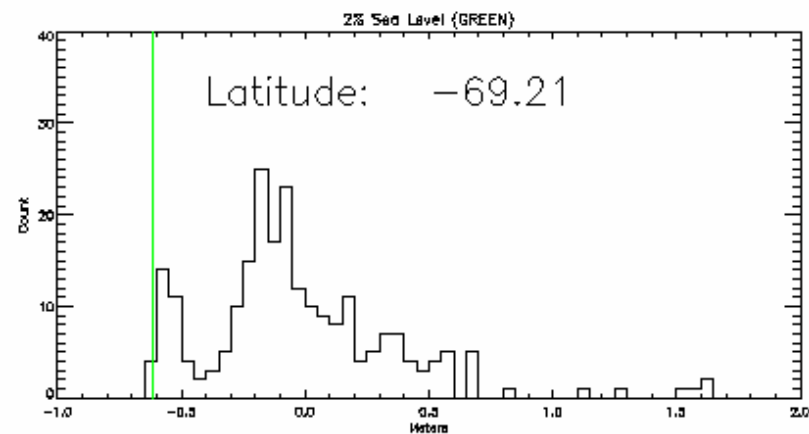
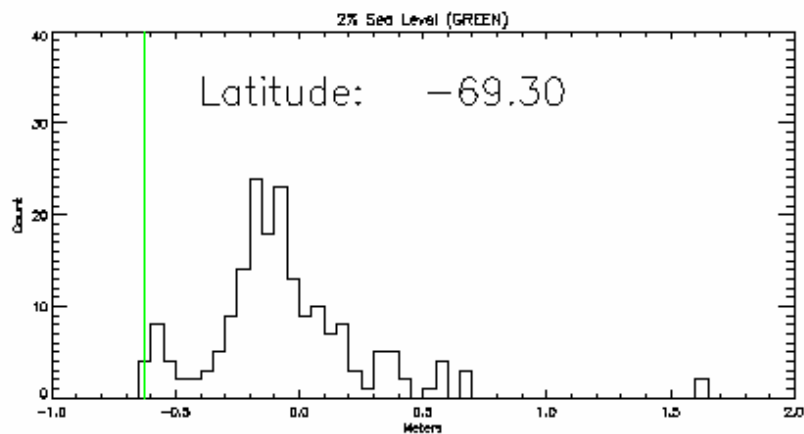
Freeboard



Sigma diff







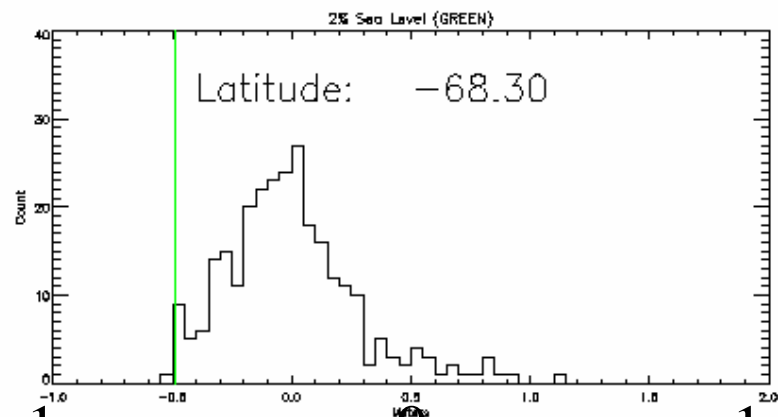
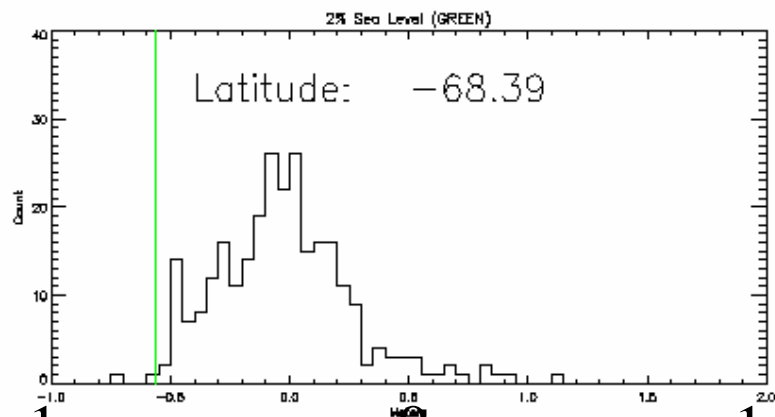
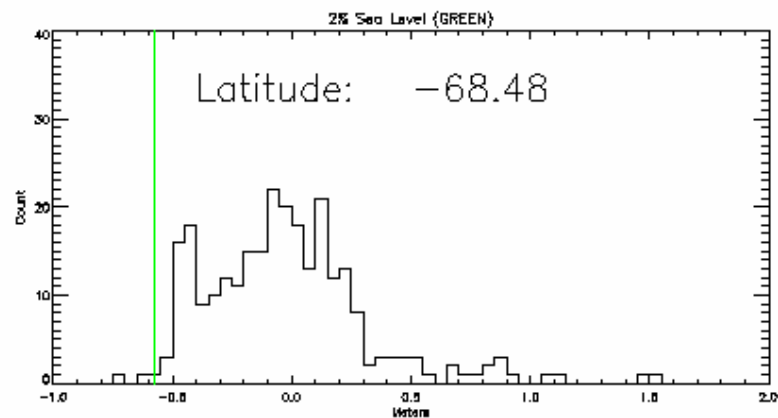
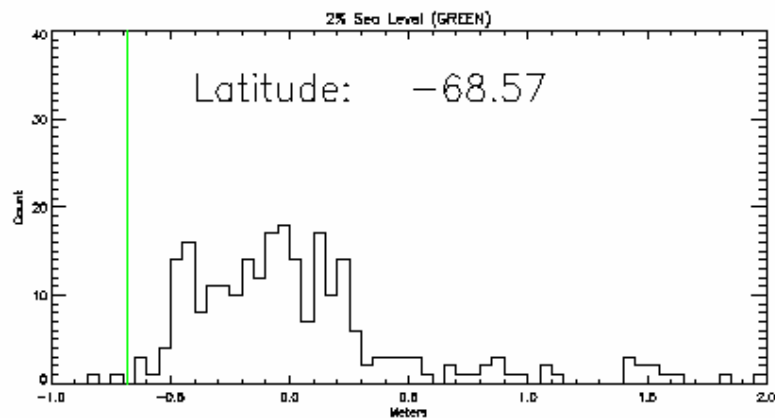
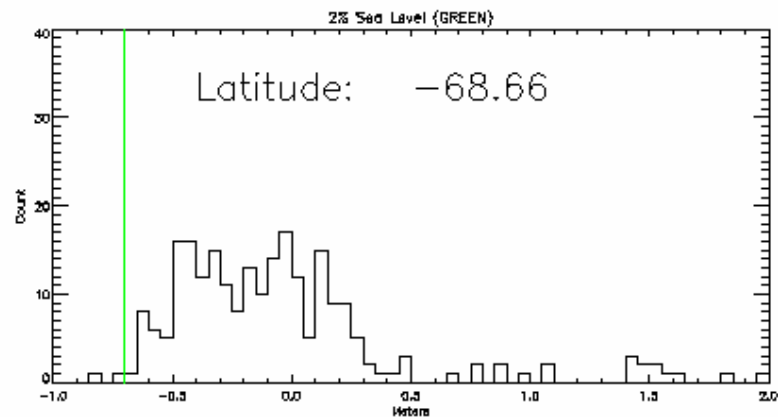
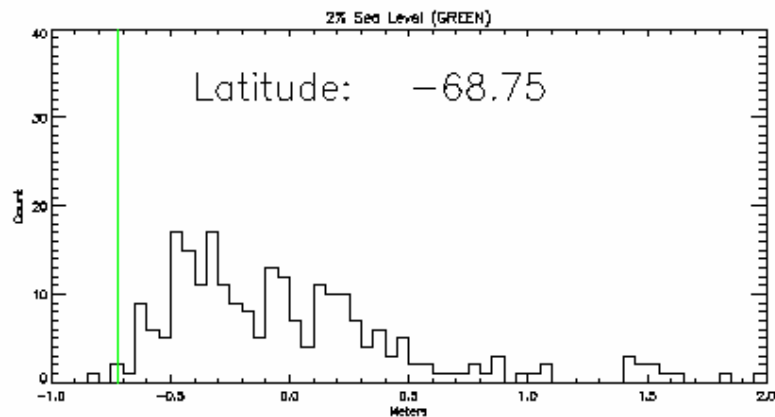
-1 m

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1 m -1 m

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1 m



-1 m

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1 m

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1 m

Graphics produced by
Thu Jan 13 17:27:26 2000

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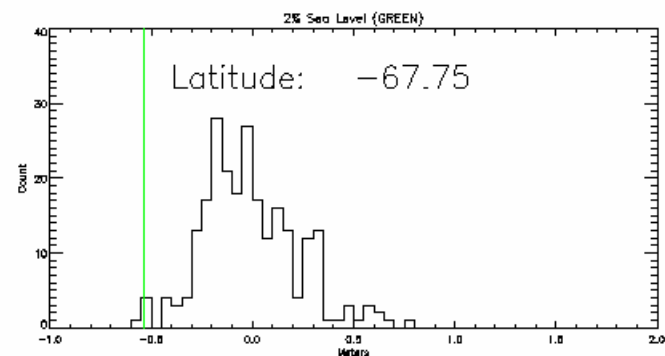
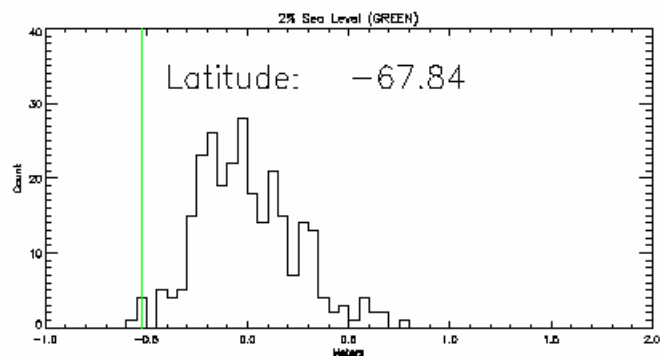
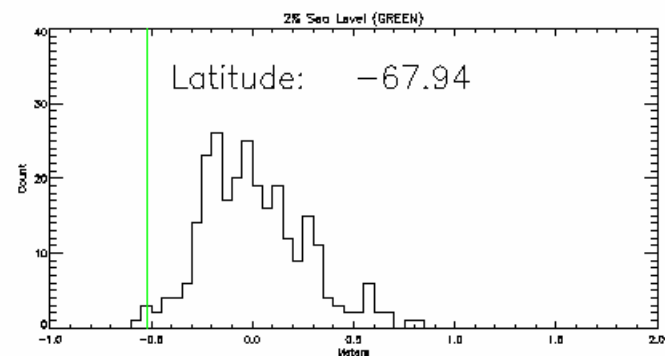
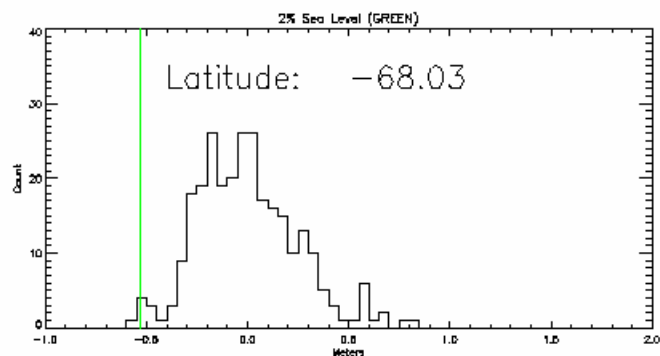
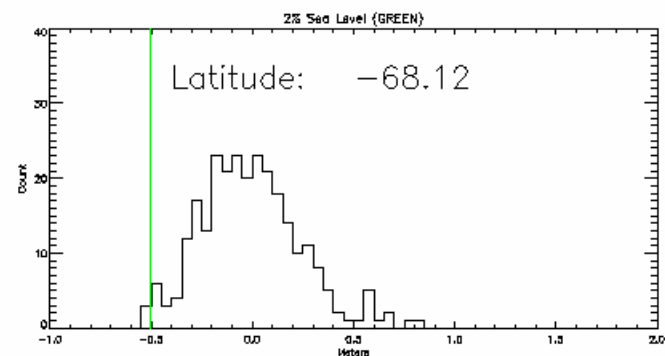
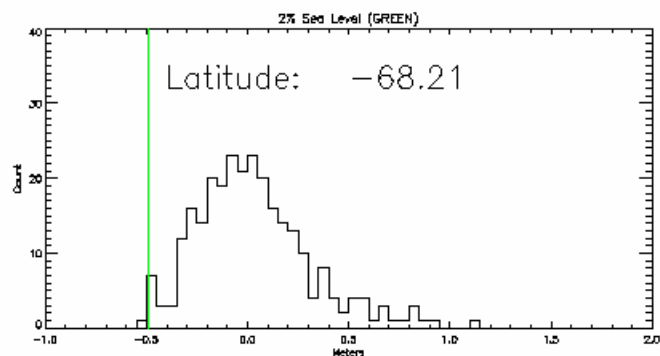
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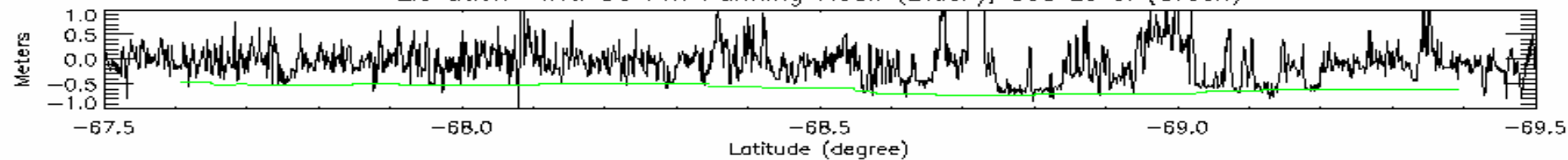
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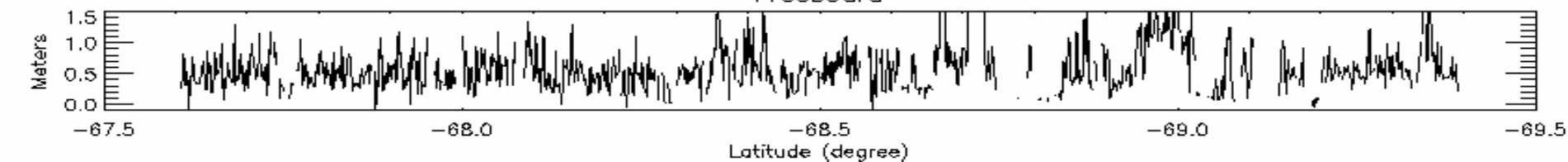
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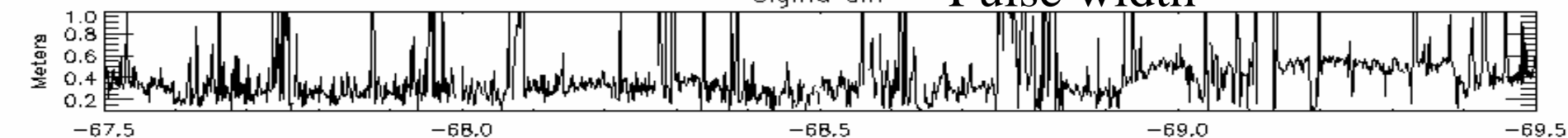
Elevation w.r.t. 50 Km Running Mean (Black), Sea Level (Green)



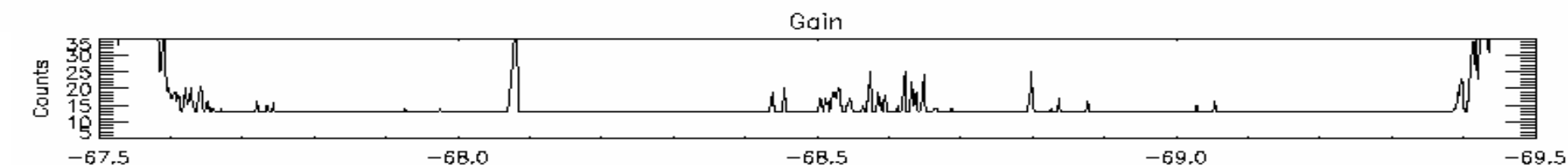
Freeboard



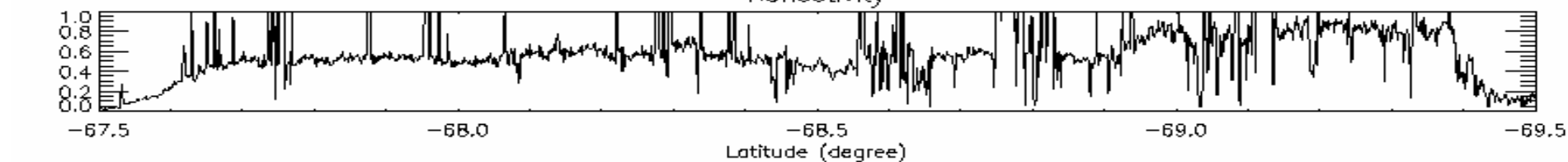
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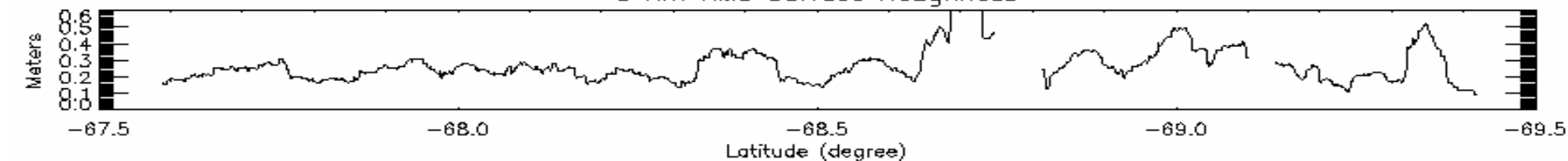
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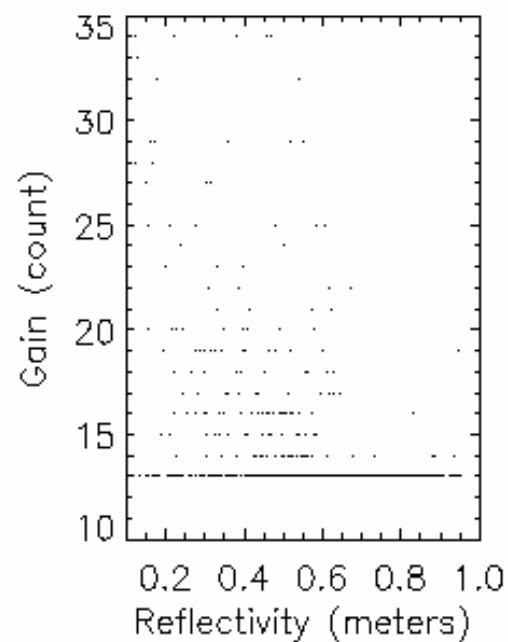
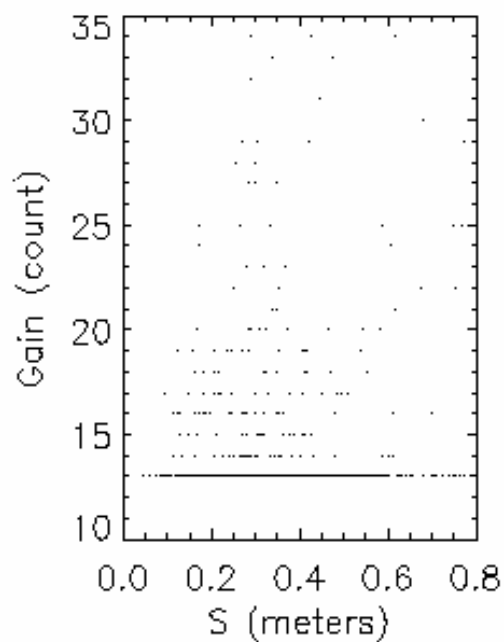
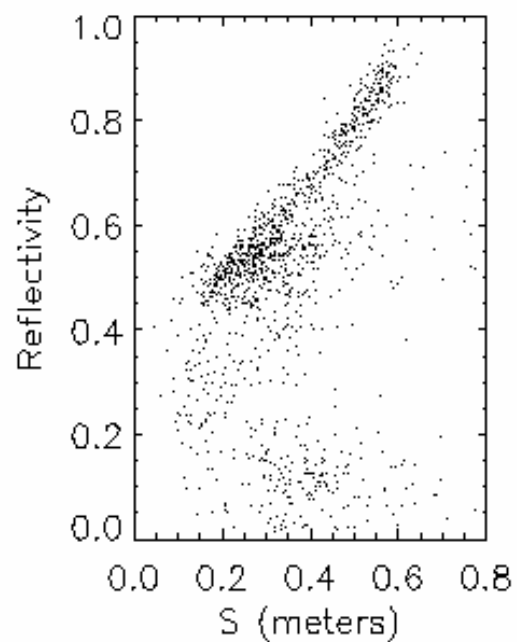
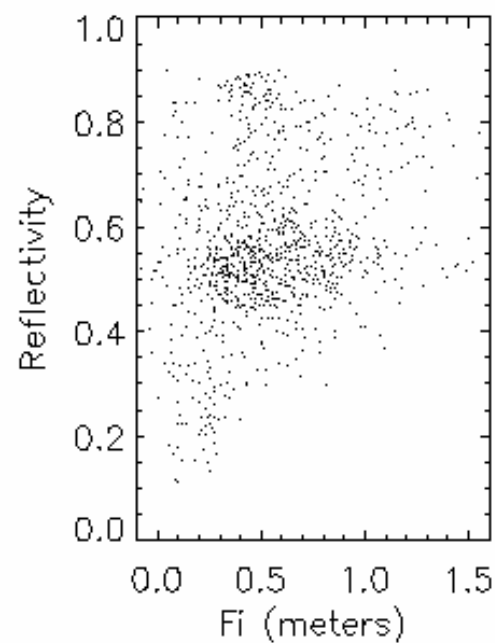
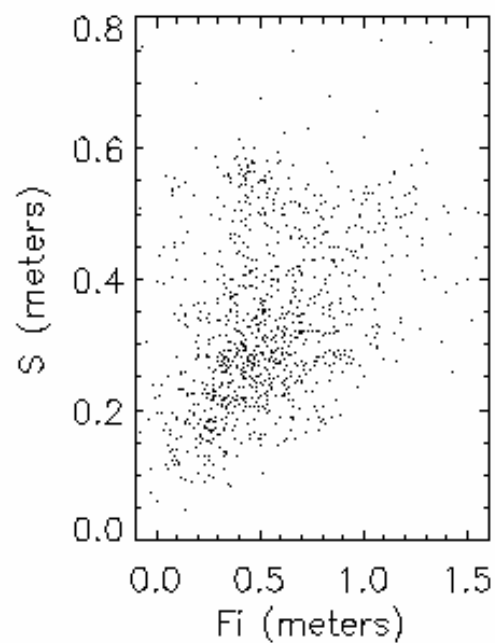
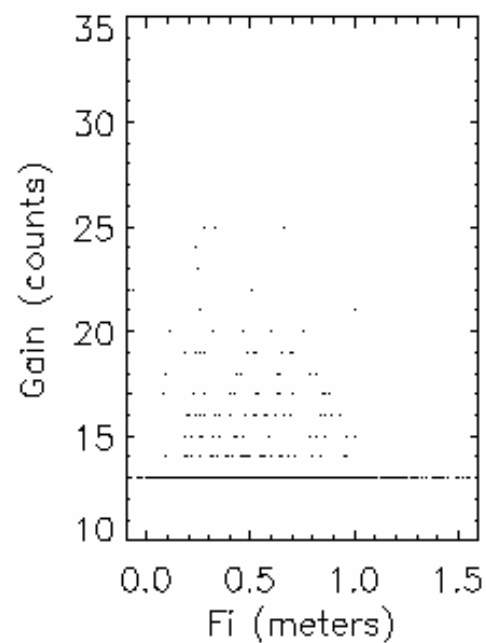


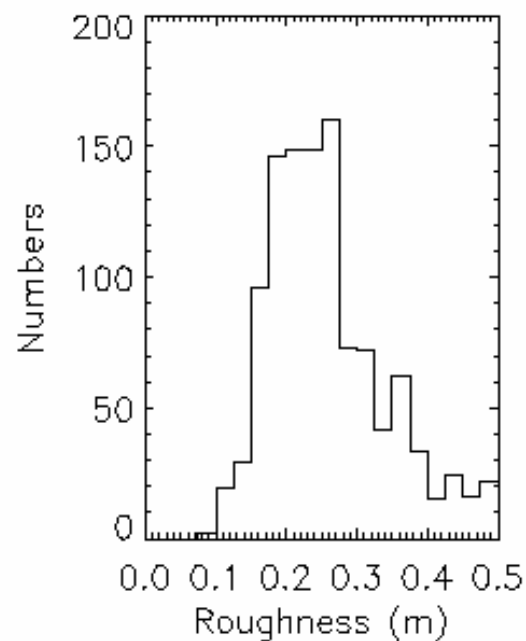
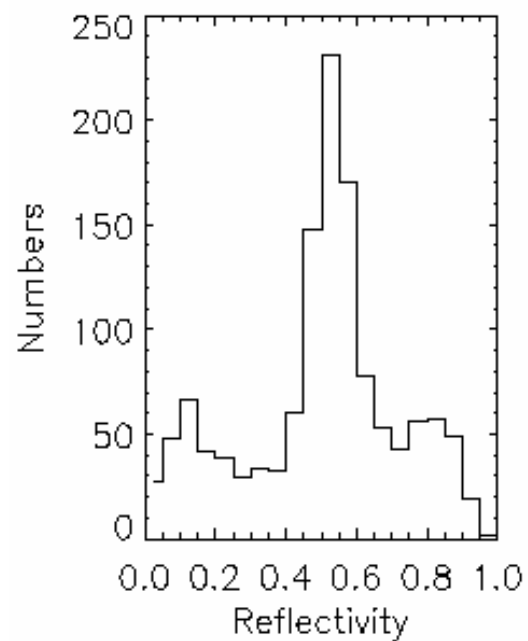
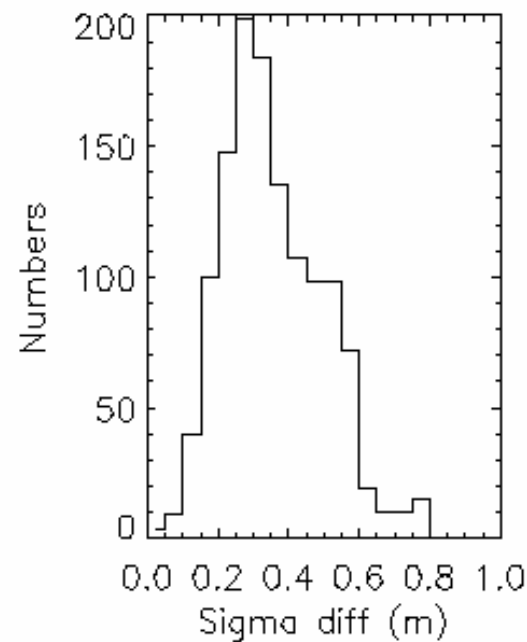
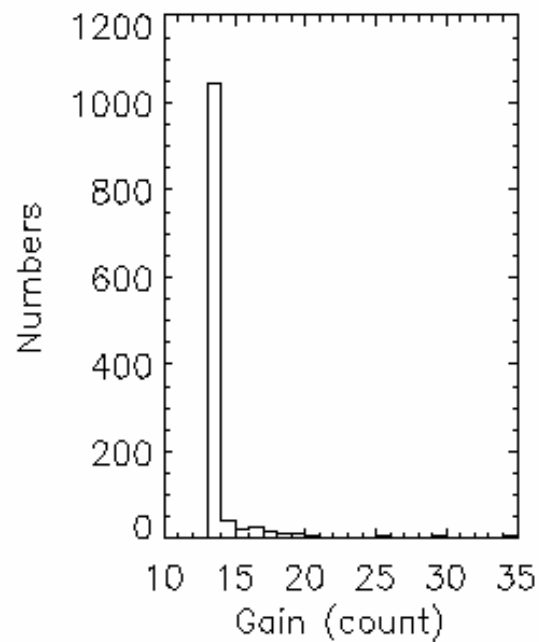
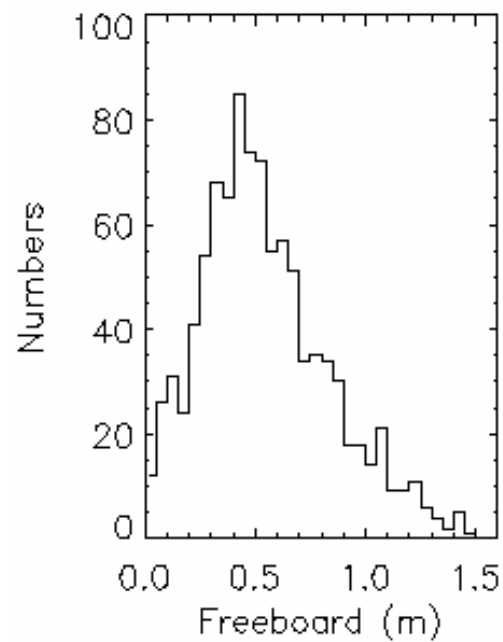
Reflectivity



5 Km RMS Surface Roughness



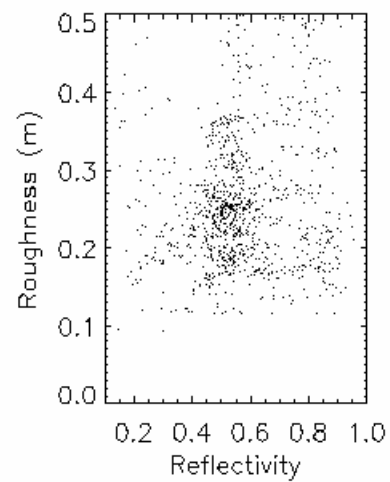




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Orientation
Media

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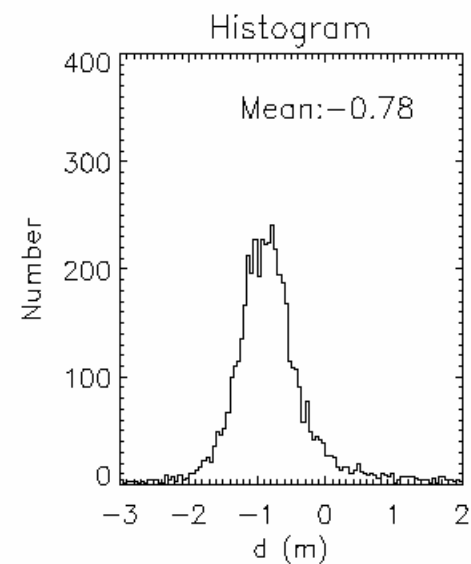
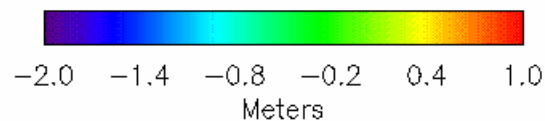
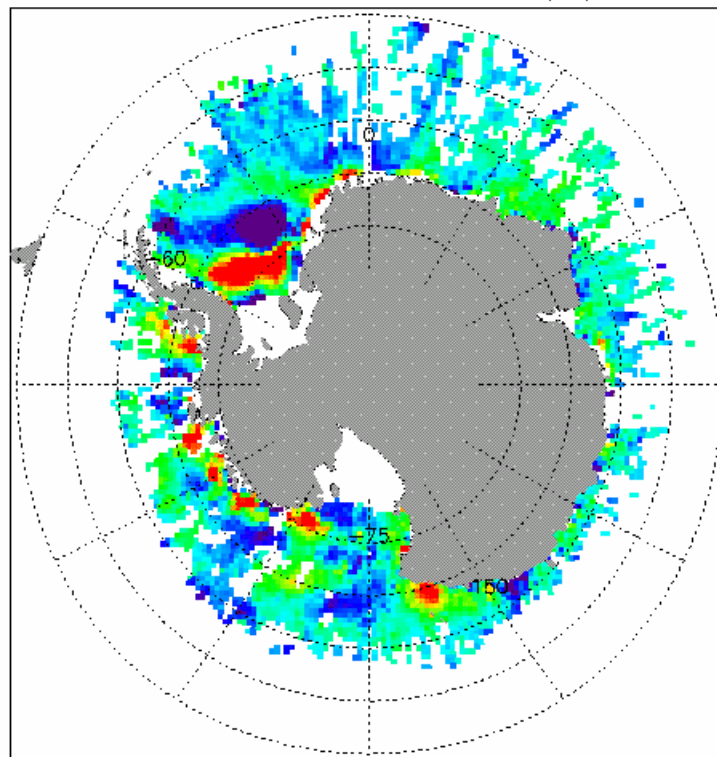
Graphics produced by
Wed Jan 12 13:11:18 2

File
Page
Magstep
Orientation
Media

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Sea level wrt Geoid used.

Oct 4 -Nov 8, 2004, d (m)



Wed Jan 12 13:14:05 2005